AIR QUALITY MODELING PROTOCOL – BART EXEMPTION MODELING

Submitted By:

SMURFIT-STONE CONTAINER ENTERPRISES, INC.

WEST POINT, VIRGINIA

Submitted To:

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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1. INTRODUCTION

Smurfit-Stone Container Enterprises, Inc. (d/b/a Smurfit-Stone Container Corporation) operates a Kraft pulp and paperboard mill located in West Point, Virginia ("Smurfit-Stone" or "the Mill"). The Mill is a major source as defined by the federal operating permit program (40 CFR Part 70) and the federal new source review (NSR) program (40 CFR Part 52).

The Mill is subject to the Regional Haze Rules listed at 40 CFR Part 51.308 which references guidelines in 40 CFR Part 51 Appendix Y for conducting a Best Available Retrofit Technology (BART) evaluation. Under the Regional Haze rules, an air quality modeling analysis is performed for facilities that have BART eligible sources to determine if the sources cause or contribute to visibility impairment at nearby Class I areas. If the BART eligible source(s) do not cause or contribute to visibility impairment, then the facility does not need to conduct technology review nor any further modeling under the Regional Haze Rules.

The Visibility Improvement State and Tribal Association of the Southeast (VISTAS) established visibility modeling procedures (VISTAS Modeling Protocol – 2005) and processed meteorological data for the CALPUFF model.

VISTAS proposed that sources may attempt to show that they do not cause or contribute to visibility impairment through a BART exemption modeling process. Consequently, Smurfit-Stone has prepared this visibility modeling protocol to outline the procedures that will be used to conduct the BART exemption modeling and to show that BART eligible sources do not cause or contribute to visibility impairment. This protocol identifies the BART eligible sources at the Mill, quantifies emission rates and stack parameters, and proposes the parameters that Smurfit-Stone will use in visibility modeling analyses. This protocol follows procedures outlined in the VISTAS Modeling Protocol.

This air quality modeling protocol includes the following sections:

Section 2	Description of the West Point Mill
Section 3	Emissions Inventory
Section 4	Visibility Modeling Approach and Technical Information
Section 5	Quality Assurance
Section 6	Presentation of Visibility Modeling Results
Section 7	References

Appendix A – Emissions Calculations Supporting Information

2. DESCRIPTION OF THE SMURFIT-STONE WEST POINT MILL

This section contains general information on the manufacturing process and a description of the geographic and topographic setting of the Mill.

2.1 MILL LOCATION

Smurfit-Stone is a Kraft pulp mill manufacturing corrugated medium and linerboard.

Smurfit-Stone is located in the town of West Point in King William County, Virginia, approximately 58 km east of Richmond, VA. A facility location map is provided in Figure 2-1. The geographical coordinates for the approximate center of the processing area of the Mill are:

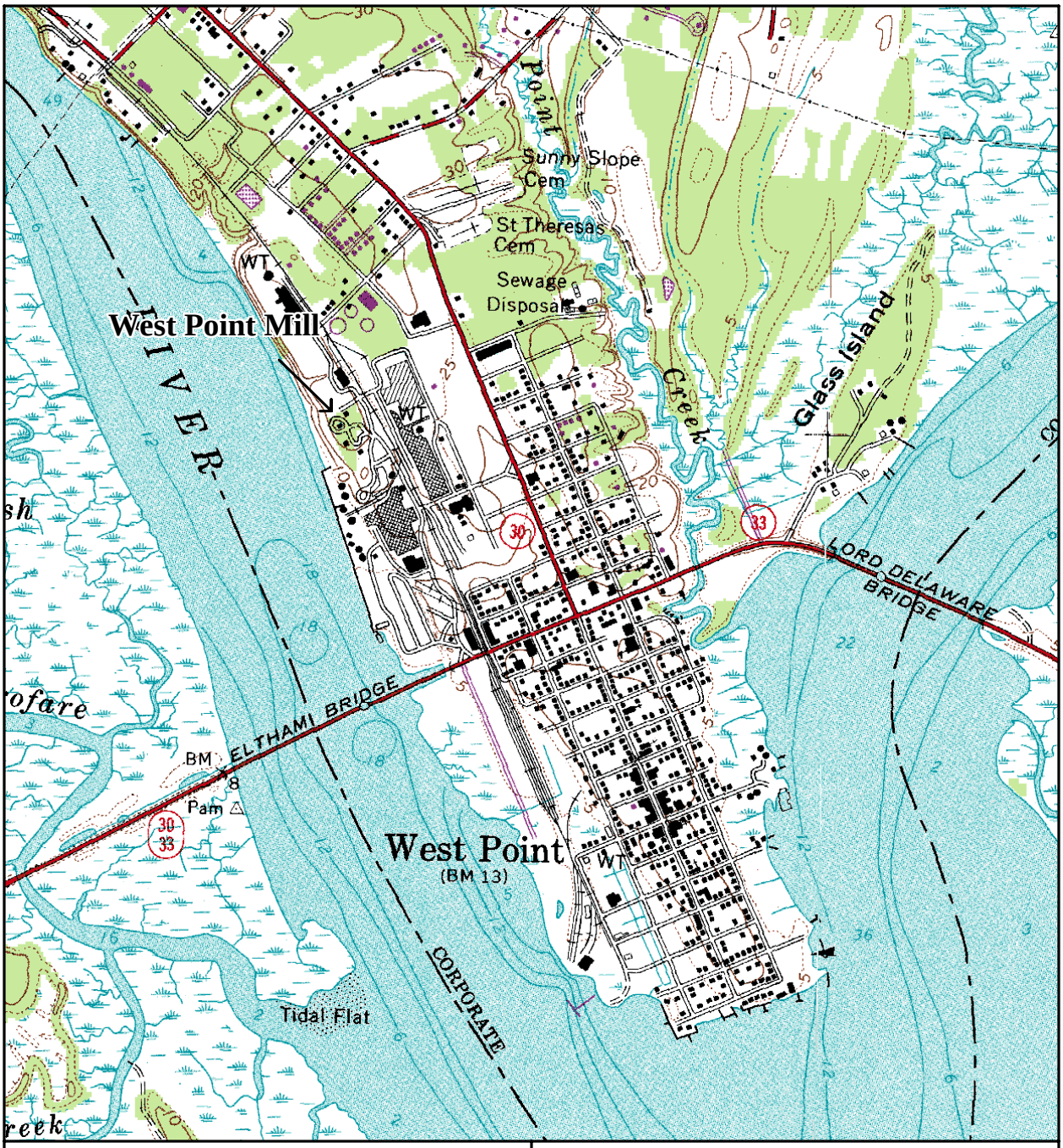
- Universal Transverse Mercator (UTM) Easting: 340,440 meters
- Universal Transverse Mercator (UTM) Northing: 4,155,911 meters
- UTM Zone : 18
- North American Datum (NAD): 1927

2.2 LOCATION OF CLASS I AREAS

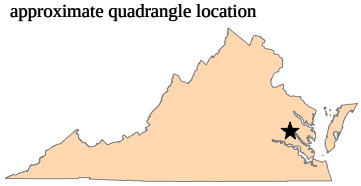
Per VISTAS guidelines, visibility impacts will be evaluated for the following Class I areas within a 300 km radius of the Mill (distance measured from the No. 8 Power Boiler stack to the closest point in the Class I area):

- Brigantine Wildlife Refuge – 296 km
- Shenandoah National Park – 169 km
- Dolly Sods Wilderness – 273 km
- Otter Creek Wilderness – 293 km
- James River Face Wilderness – 228 km
- Swanquarter National Wildlife Refuge – 235 km

A map showing the locations of the Class I areas and the Mill is provided in Figure 2-2



approximate quadrangle location



0 0.5 1

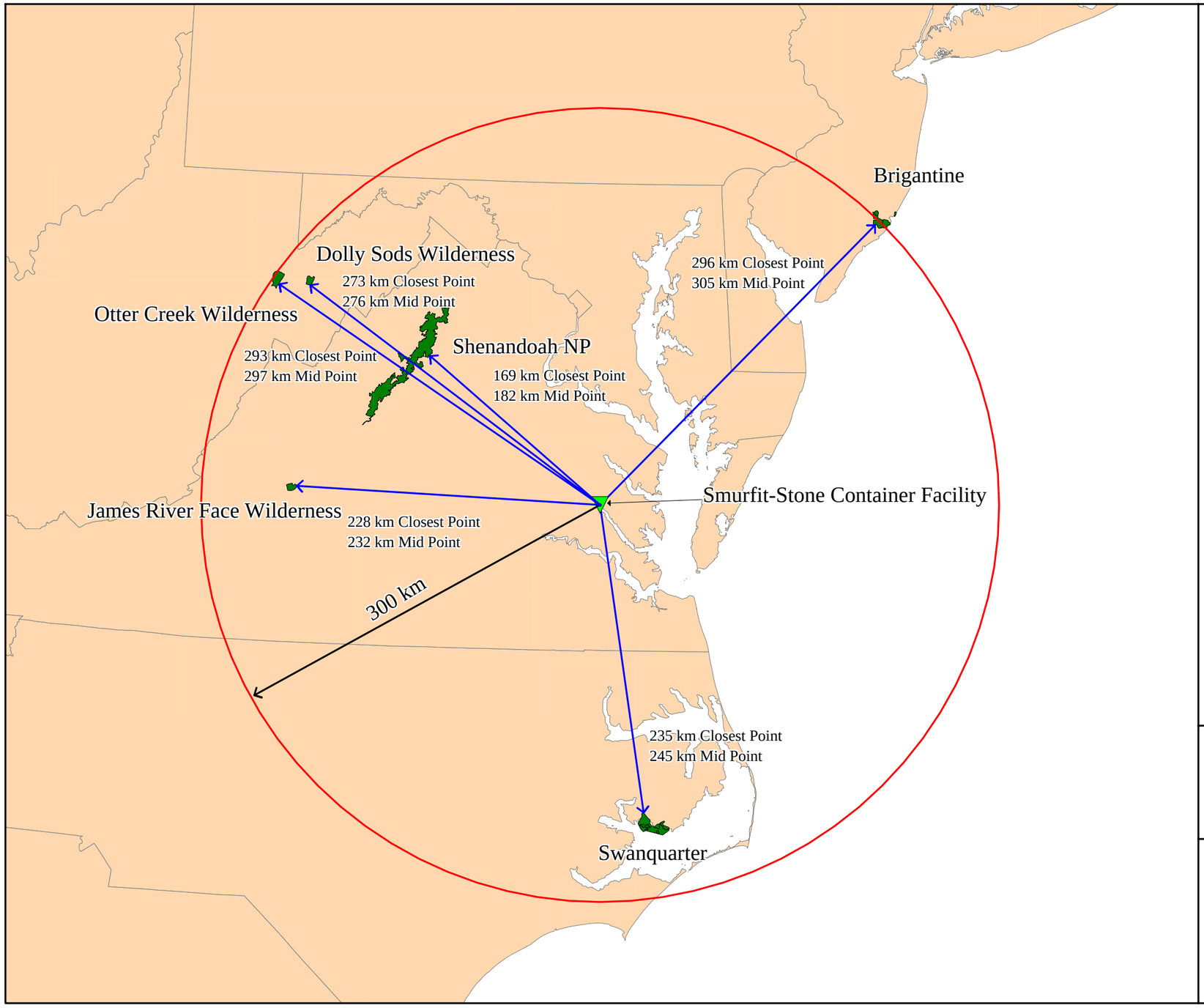
kilometers

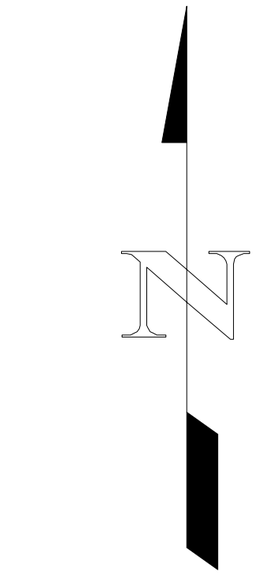
N

Based on USGS 1:24,000 topographical map for West Point, Virginia 1986.

Smurfit-Stone Container Enterprises, Inc.
West Point, Virginia Mill

Figure 2-1
Facility Location Map





Class I Areas Within 300 km of Facility

Figure 2-2
Smurfit-Stone Container Enterprises, Inc.
West Point, Virginia

3. EMISSIONS INVENTORY

This section identifies the BART eligible units at the Mill and provides an overview of the emissions data that were developed for the BART exemption modeling analysis.

3.1 BART ELIGIBLE SOURCES

According to the final Regional Haze Regulations and Guidelines for BART Determinations published on July 6, 2005 in the Federal Register, an emissions unit is considered BART eligible if all the following three criteria are met:

- The emissions unit was installed between August 7, 1962 and August 7, 1977;
- The potential emissions are 250 tpy or greater of at least one visibility impairing pollutant across all BART eligible units (VISTAS defines visibility impairing pollutants as SO_2, NO_X, H_2SO_4, PM_{10} and PM_{10} sub-species, and NH_3.), and;
- The unit falls within one of the 26 listed source categories summarized in the guidance.

VISTAS concluded that VOC emissions should not be subject to BART, as stated in Section 4.1.3 of the VISTAS Modeling Protocol. Also, VISTAS has recently decided that only large sources of ammonia (i.e., BART eligible emissions of ammonia with a potential to emit of greater than 250 tpy) need to consider ammonia emissions in any visibility modeling analysis for BART. The West Point Mill is not a large source of ammonia, and is providing ammonia emissions for completeness purposes only.

The BART eligible emissions units at the Mill that will be included in the exemption modeling are:

- No. 8 Power Boiler
- No. 4 Recovery Furnace
- No. 4 Smelt Dissolving Tank
- No. 15 Lime Slaker

These emissions units have been identified by the Virginia Department of Environmental Quality (VA DEQ) as meeting the emissions and installation date criteria for BART. These are the only emissions units at the Mill that will be included in the BART exemption modeling.

Other emissions units at the West Point Mill meet the BART eligibility criteria, but are sources of VOC only. These VOC only emissions units at the West Point Mill are:

- No. 1 Paper Machine
- No. 2 Paper Machine
- No. 4 Salt Cake Mix Tank
- No. 2 Line Primary Rejects A/B Tank
- Primary Screen Supply Tank
- Secondary Fiber Plant
- Waste Water Treatment System
- Waste Water System Heat Stripper

Emissions from these units will not be considered in the visibility modeling analysis of the West Point Mill.

3.2 EMISSION RATES

The Regional Haze Regulations state that the highest 24-hour average actual emission rate of visibility impairing pollutants observed from BART eligible sources during the most recent three to five years should be used in the visibility modeling analysis.

Except for No. 8 Power Boiler, the Mill relied on the following data, shown in order of priority, to establish the highest 24-hour average actual emission rates provided in Table 3-1:

- Continuous Emission Monitoring System (CEMS) data

Table 3-1
Maxium 24-hr Average Emission Rates - BART Eligible Sources
Smurfit-Stone Container Enterprises - West Point Mill

Source Name	SO_2 Emissions	H_2SO_4 Emissions	NO_x Emissions	PM_{10} Emissions[(a)]	$PM_{2.5}$ Emissions[(a)]	NH_3 Emissions
	g/s	g/s	g/s	g/s	g/s	g/s
No. 8 Power Boiler	18.12	1.01	33.76	2.96	2.41	0.002
No. 4 Recovery Furnace	20.67	0.06	8.78	5.77	4.98	0.00
No. 4 Smelt Dissolving Tank North Stack	0.00	0.00	0.12	0.36	0.33	0.43
No. 4 Smelt Dissolving Tank South Stack	0.00	0.00	0.12	0.36	0.33	0.43
No. 15 Lime Slaker	0.00	0.00	0.00	0.04	0.04	0.47

[(a)] These emission rates will not actually be included in the CALPUFF modeling analysis. An emission rate of PM_{10} represents all condensable and filterable particulate emissions less than 10 microns in diameter (Including $PM_{2.5}$). An emission rate of $PM_{2.5}$ represents all condensable and filterable particulate emissions less than 2.5 microns in diameter. They are included for completeness purposes only. The PM emission rates used in the CALPUFF modeling analysis are refined into six different size categories. The sum of the PM emissions from the various size categories matches the value shown in this table.

- Daily production and fuel throughputs combined with site-specific emission factors;
- Daily production and fuel throughputs combined with National Council for Air and Stream Improvement (NCASI) pulp and paper industry-specific emission factors;
- Daily production and fuel throughputs combined with USEPA AP-42 emission factors.

Where used, median NCASI emissions factors were selected. Production and fuel throughput data were obtained from the Mill's accounting records.

The emission rates provided for the No. 8 Power Boiler are the future permit limits in effect not later than 180 days after commencing with the operation of the wet gas scrubber in mid-2007. DEQ is currently in the process of issuing a permit for construction of the scrubber. The scrubber is being installed pursuant to a Consent Decree agreed to by DEQ, USEPA, and Smurfit-Stone and entered by the District Court (E.D. Va.) in Civil Action No. 3:04-CV-647 on November 4, 2004. The Consent Decree requires that the scrubber be installed prior to November 4, 2007, which will ensure that the unit is in operation by the date that DEQ is required to submit the State Implementation Plan revision for Regional Haze to the USEPA (December 17, 2007).

Smurfit-Stone originally submitted to VA DEQ on April 27, 2006, the detailed supporting documentation of all the emission rates for each BART eligible unit. That documentation is now included in Appendix A and summarized in Table 3-1.

3.3 STACK CHARACTERISTICS

The stack characteristics for the BART eligible sources are provided in Table 3-2. These data are representative of actual operating conditions. The stack coordinates shown are in the Universal Transverse Mercator Projection for Zone 18 but will be transformed to a Lambert-Conformal projection in order to enter them into the CALPUFF model.

Table 3-2
Stack Characteristics - BART Eligible Sources
Smurfit-Stone Container Enterprises - West Point Mill

Source Name	UTM E	UTM N	Stack Height	Base Elevation	Stack Diameter	Stack Gas Exit Velocity	Stack Gas Exit Temp.
	km	*km*	*m*	*m*	*m*	*m/s*	*K*
No. 8 Power Boiler	340.44	4155.911	53.35	1.8	2.74	18.36	333.15
No. 4 Recovery Furnace	340.54	4155.970	82.30	3.1	3.71	14.11	444.26
No. 4 Smelt Dissolving Tank North Stack	340.51	4156.018	85.06	3.1	1.37	6.40	333.15
No. 4 Smelt Dissolving Tank South Stack	340.51	4155.997	85.06	3.1	1.37	6.40	333.15
No. 15 Lime Slaker	340.41	4155.981	30.79	1.5	0.91	3.89	302.32

The VISTAS Modeling Protocol states that sources that are not within 50 km of a Class I area can exclude building downwash effects in the visibility modeling analysis. As shown in Section 2.2, the Mill is not located within 50 km of any Class I area; hence, no building downwash information is included in this protocol.

4. VISIBILITY MODELING APPROACH AND TECHNICAL INFORMATION

This section contains information on the technical approach that will be followed in the air quality modeling study. The technical approach follows the guidance established in the VISTAS Modeling Protocol and outlines the configurations for CALMET and CALPUFF that will be used to model the BART sources at the Mill.

4.1 CALMET CONFIGURATION

CALMET was configured by VISTAS as outlined in Section 4.4 of the VISTAS modeling protocol. VISTAS ran CALMET using both gridded prognostic meteorological data (MM5), as well as observations from surface and upper air stations, to create a 4-km resolution CALPUFF-ready three dimensional meteorological data set. VISTAS ran CALMET in this fashion for 2001, 2002, and 2003. It should be noted that the 4-km CALMET data differ significantly from the 12-km CALMET data that was also provided by VISTAS. The 12-km data were created from a CALMET run that considered prognostic data only, with no observations included. This so-called "No-Obs" mode is a less refined application of CALMET. For this reason, Smurfit-Stone is choosing the more refined 4-km CALMET data that have been provided by VISTAS. Smurfit-Stone will not modify the 4-km CALMET files in any way. The CALMET Domain No. 5, as shown in Figure 4-4 of the VISTAS modeling protocol, will be used in this analysis. This domain is sufficiently large enough to model the Mill and all Class I areas of concern. Smurfit-Stone acquired Domain No. 5 from VA DEQ in April 2006.

4.2 CALPUFF CONFIGURATION

The following configurations will be used, as outlined in the VISTAS Modeling Protocol in Sections 4.3.3 and 4.4.2:

- No building downwash considered;

- CALPUFF domains will be set to an area that provides an adequate buffer around all modeled Class I areas. The domains will be sized so to ensure at least a 50 km buffer surrounding the Class I area;

- Modeled species: SO_2, H_2SO_4, NO_X, and PM_{10} (including sub-PM_{10} speciations) from the BART eligible sources at the Mill;

- The receptor grids developed by the National Park Service for the Brigantine Wildlife Refuge, Shenandoah National Park, Dolly Sods Wilderness, Otter Creek Wilderness, James River Face Wilderness, Swanquarter National Wildlife Refuge will be used;

- The Pasquill-Gifford (PG) dispersion option will be used;

- Observed non-urban ozone data for the 2001-2003 CASTnet and AIRS monitoring networks will be used, and;

- A background ammonia concentration of 0.5 ppb will be used.

4.3 CALPOST AND POSTUTIL CONFIGURATION

CALPOST and POSTUTIL will be configured to estimate visibility impacts at each Class I area. Smurfit-Stone proposes to not use the Ammonia Limiting Method that has recently been approved by VISTAS for use in the 4-km analyses. The following configurations, as outlined in the VISTAS Modeling Protocol, will be used:

- Visibility Method 6 with Class I area specific monthly relative humidity values will be used, and;

- Natural background light extinction values will be calculated using the USEPA's "Guidance for Estimating Visibility for Regional Haze Estimates" guidance document. A Rayleigh scattering efficiency of 10 Mm^{-1} will be used for all Class I areas. This is the value recommended by VISTAS for BART exemption analyses using 12-km CALMET data. Smurfit-Stone proposes to use this same value for Rayleigh scattering in the 4-km visibility analysis of the West Point Mill.

5. QUALITY ASSURANCE AND QUALITY CONTROL

This section discusses the quality assurance procedures that will be in place for the modeling analysis. The quality assurance procedures include confirming the accuracy of information as well as making certain quality control is applied throughout the visibility modeling analysis. Smurfit-Stone will follow the procedures outlined in Section 6 of the VISTAS Modeling Protocol, as appropriate.

5.1 QUALITY CONTROL OF SOURCE SPECIFIC DATA

Smurfit-Stone has taken all prudent steps to ensure that the stack parameters and emissions data that were previously submitted to VA DEQ are quality assured. Specifically, Smurfit-Stone reviewed the basis for all information, performed calculation checks, and documented assumptions. The final summaries of emission data and source characteristics were reviewed for reasonableness and consistency with previous Mill information.

5.2 QUALITY CONTROL OF CALMET, CALPUFF, AND CALPOST CONTROL FILES

As stated previously in this protocol, Smurfit-Stone will be using 4-km CALMET data developed by VISTAS for use in BART modeling analyses. The 4-km domain for Virginia is referred to as “Domain 5” by VISTAS. Smurfit-Stone is not proposing to change the CALMET data in any way during the visibility modeling analysis. Since the CALMET data will not be altered, Smurfit-Stone will rely on the VISTAS quality control procedures.

The CALPUFF and CALPOST control files, including the POSTUTIL control file will be quality assured by Smurfit-Stone. The first step of quality assurance will be to confirm that all stack information, including emission rates, are entered into the CALPUFF control file as they were previously reported to VA DEQ. The second step

will be to ensure that all options in CALPUFF, CALPOST, and POSTUTIL conform to the model options discussed in this protocol.

5.3 QUALITY CONTROL OF MODEL OUTPUT FILES

A review of the visibility modeling results will be performed to determine whether there are any anomalies associated with the results. Specifically, the wind fields, species extinction coefficients, distribution of visibility impacts, and other variables will be reviewed for reasonableness.

6. PRESENTATION OF VISIBILITY MODELING RESULTS

This section discusses how the results from the visibility modeling analyses will be evaluated. Smurfit-Stone intends to submit the BART exemption modeling results to VA DEQ by mid-August 2006, assuming VA DEQ's review and approval of this protocol is received by the end of June 2006.

6.1 SUBMITTAL OF AIR QUALITY MODELING RESULTS

A report will be submitted to VA DEQ that presents the results of the BART exemption modeling analysis. For the purposes of this analysis, the Smurfit-Stone will be exempt from further modeling requirements under the BART rule if the results show that the eight-highest (98^{th} percentile) daily visibility impact is less than 0.5 deciviews for all BART eligible units for each of the three years modeled. The modeling report will include a summary of emission rates, stack characteristics and a results table, and will follow the guidelines of Section 4.5 of the VISTAS Modeling Protocol.

7. REFERENCES

VISTAS 2005 – “Protocol for the Application of the CALPUFF Model for Analyses of Best Available Retrofit Technology (BART)” - Visibility Improvement State and Tribal Association of the Southeast (VISTAS) (updated March 2006)

Appendix A. Emissions Calculations Supporting Information

Table A1
BART Emissions Inventory Summary
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT

Stack ID #	Company/Source	Location			Location UTM				Stack Height	Base Elevation	Diameter	Gas Exit Velocity	Stack Gas Exit Temp.	SO_2 Emissions	H_2SO_4 Emissions	NO_x Emissions	PM_{10} Emissions[a]	$PM_{2.5}$ Emissions[a]	NH_3 Emissions	particle speciation[b]		condensable				filterable											
																						organic condensable (OC)		inorganic condensable		COARSE		SOIL				Elemental Carbon[c] (EC)			
		latitude	longitude	Datum	UTM East	UTM North	UTM Zone	Datum												filterable PM_{10}	condensable PM_{10}	0.625-1.0 µm	0.5-0.625 µm	0.625-1.0 µm	0.5-0.625 µm	6-10 µm	2.5-6 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm
		deg.	deg.		km	km			ft	ft	ft	ft/s	deg F	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	%	%	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr	lbs/hr
	No. 8 Power Boiler	37.538	76.806		340.44	4155.911	18	27	175	6.0	9.0	60.25	140.18	143.780	8.000	267.930	31.500	27.125	0.012	48%	26%	0.000	0.000	1.530	1.530	7.767	2.248	3.270	0.818	2.248	4.088	0.000	0.000	0.000	0.000
	No. 4 Recovery Furnace	37.539	76.805		340.54	4155.9701	18	27	270	10.0	12.2	46.31	340.18	164.051	0.480	69.722	46.299	40.005	0.000	45%	55%	2.232	2.232	10.169	10.169	1.861	3.941	3.640	1.724	3.284	6.075	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank North Stack	37.539	76.805		340.51	4156.0177	18	27	279	10.0	4.5	21.00	140.18	0.000	0.000	0.942	2.865	2.648	3.425	82%	18%	0.048	0.048	0.203	0.203	0.029	0.187	0.470	0.232	0.422	1.022	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank South Stack	37.539	76.805		340.51	4155.997	18	27	279	10.0	4.5	21.00	140.18	0.000	0.000	0.942	2.865	2.648	3.425	82%	18%	0.048	0.048	0.203	0.203	0.029	0.187	0.470	0.232	0.422	1.022	0.000	0.000	0.000	0.000
	No. 15 Lime Slaker	37.539	76.806		340.41	4155.981	18	27	101	5.0	3.0	12.76	84.69	0.000	0.000	0.000	0.292	0.292	3.722	100%	0%	0.000	0.000	0.000	0.000	0.000	0.000	0.073	0.073	0.073	0.073	0.000	0.000	0.000	0.000

Stack ID #	Company/Source	Location			Location UTM				Stack Height	Base Elevation	Diameter	Gas Exit Velocity	Stack Gas Exit Temp.	SO_2 Emissions	H_2SO_4 Emissions	NO_x Emissions	PM_{10} Emissions[a]	$PM_{2.5}$ Emissions[a]	NH_3 Emissions	particle speciation[b]		organic condensable (OC)		inorganic condensable		COARSE		SOIL				Elemental Carbon[c] (EC)			
		latitude	longitude	Datum	UTM East	UTM North	UTM Zone	Datum												filterable PM_{10}	condensable PM_{10}	0.625-1.0 µm	0.5-0.625 µm	0.625-1.0 µm	0.5-0.625 µm	6-10 µm	2.5-6 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm	1.25-2.5 µm	1.0-1.25 µm	0.625-1.0 µm	0.5-0.625 µm
		deg.	deg.		km	km			m	m	m	m/s	K	g/s	g/s	g/s	g/s	g/s	g/s	%	%	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s
	No. 8 Power Boiler	37.538	76.806		340.44	4155.911	18	27	53.35	1.8	2.74	18.36	333.15	18.12	1.01	33.76	3.97	3.42	0.002	48%	26%	0.000	0.000	0.193	0.193	0.979	0.283	0.412	0.103	0.283	0.515	0.000	0.000	0.000	0.000
	No. 4 Recovery Furnace	37.539	76.805		340.54	4155.9701	18	27	82.30	3.1	3.71	14.11	444.26	20.67	0.06	8.78	5.83	5.04	0.00	45%	55%	0.281	0.281	1.281	1.281	0.234	0.497	0.459	0.217	0.414	0.765	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank North Stack	37.539	76.805		340.51	4156.0177	18	27	85.06	3.1	1.37	6.40	333.15	0.00	0.00	0.12	0.36	0.33	0.43	82%	18%	0.006	0.006	0.026	0.026	0.004	0.024	0.059	0.029	0.053	0.129	0.000	0.000	0.000	0.000
	No. 4 Smelt Dissolving Tank South Stack	37.539	76.805		340.51	4155.997	18	27	85.06	3.1	1.37	6.40	333.15	0.00	0.00	0.12	0.36	0.33	0.43	82%	18%	0.006	0.006	0.026	0.026	0.004	0.024	0.059	0.029	0.053	0.129	0.000	0.000	0.000	0.000
	No. 15 Lime Slaker	37.539	76.806		340.41	4155.981	18	27	30.79	1.5	0.91	3.89	302.32	0.00	0.00	0.00	0.04	0.04	0.47	100%	0%	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.009	0.009	0.009	0.000	0.000	0.000	0.000

[a] These emission rates will not actually be included in the CALPUFF modeling analysis. An emission rate of PM_{10} represents all condensable and filterable particulate emissions less than 10 microns in diameter (Including $PM_{2.5}$). An emission rate of $PM_{2.5}$ represents all condensable and filterable particulate emissions less than 2.5 microns in diameter. They are included for completeness purposes only.

[b] For the BART eligible sources where both condensable and filterable PM_{10} are emitted, the percentages shown were calculated as follows:
condensable PM_{10} percentage = condensable emission rate/ (condensable emission rate + filterable emission rate)
filterable PM_{10} percentage = condensable emission rate/ (condensable emission rate + filterable emission rate)

[c] Due to the nature of the BART eligible sources at the Smurfit-Stone West Point Mill, no emissions of elemental carbon (i.e., unburned carbon, soot) are assumed. For the No. 8 Power Boiler, AP-42 Section 1.1.3 states that pulverized coal systems emit primarily inorganic ash residues as filterable particulate matter, due to the combustion characteristics of pulverized coal. For the No. 4 Recovery Furnace, NCASI literature and AP-42 describe the filterable particulate emissions as consisting largely of inorganic filterable material such as salts, and not unburned carbon.

Table A2

No. 8 Power Boiler BART Emissions Inventory

Smurfit-Stone Container Enterprises - West Point, VA Mill

MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
Ammonia	0.000565	lb/ton coal	FIRE version 6.23 emission factor database	0.012	0.002	
NO_X	267.93	lb/hr	Based on highest 24-hr average rolling CEMS value.	267.93	33.759	The highest 24-hr average rolling NOX emission rate occurred on April 21, 2005. The CEMS data was reviewed for the periods between December 20, 2004 and December 31, 2005. The Boiler is equipped with a low-NOX burner system that commenced operation on December 20, 2004.
SO_2	0.26	lb/MMBtu	Based on scrubber vendor guarantee and Consent Decree condition (U.S. District Court Civil Action No. 3:04-CV-647, condition 10).	143.78	18.116	
H_2SO_4	8.00	lb/hr	Based on scrubber vendor guarantee.	8.00	**1.008**	This value is used in the No. 8 PB PM Distribution Calculation Spreadsheet. The emissions of H_2SO_4 are subtracted from the calculated condensable particulate emissions.
Filterable PM_{10} - PM_6	38.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber.	7.77	0.979	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. No emissions of elemental carbon (soot) are assumed.
Filterable PM_6 - $PM_{2.5}$	11.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber.	2.25	0.283	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. No emissions of elemental carbon (soot) are assumed.
Filterable $PM_{2.5}$ - $PM_{1.25}$	16.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber.	3.27	0.412	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. No emissions of elemental carbon (soot) are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	4.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber.	0.82	0.103	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. No emissions of elemental carbon (soot) are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	11.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber.	2.25	0.283	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. No emissions of elemental carbon (soot) are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	20.0%	% of total PM10	AP-42 Table 1.1-6 for dry bottom boilers burning pulverized bituminous and subbituminous coal controlled by scrubber.	4.09	0.515	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that due to the combustion characteristics of pulverized coal, the combustion process is nearly complete resulting in particulate emissions consisting of inorganic ash residues. No emissions of elemental carbon (soot) are assumed.
Inorganic Condensable $PM_{1.0}$ - $PM_{0.625}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	1.53	0.193	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that condensable particulate emissions for coal fired boilers is primarily inorganic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions from the condensable PM emissions calculated below from AP-42.
Inorganic Condensable $PM_{0.625}$ - $PM_{0.5}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	1.53	0.193	AP-42 Section 1.1.3.1 for bituminous and subbituminous coal fired boilers states that condensable particulate emissions for coal fired boilers is primarily inorganic in nature. The value shown here reflects the subtraction of H2SO4 emissions from the condensable PM emissions calculated below from AP-42.
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM_{10}	31.5	lb/hr	Scrubber vendor guarantee and DEQ permit limit.	31.50	3.969	
Condensable PM	0.02	lb/MMBtu	AP-42 Table 1.1-5 for Bituminous and Subbituminous Coal Combustion with FGD Control.	11.06	**1.394**	This value is used in the No. 8 PB PM Distribution Calculation Spreadsheet.
Total Filterable PM_{10}	64.9%	% of total PM10	Assumed that the permit limit represents both filterable and condensable PM_{10}. The percentage filterable was found by subtracting out the condensable portion (based on an AP-42 factor for condensable PM) from the permit limit.	20.44	**2.575**	This value is used in the No. 8 PB PM Distribution Calculation Spreadsheet.
Total Filterable $PM_{2.5}$	51.0%	% of total PM10	AP-42 Table 1.1-6 for Dry Bottom Boilers Burning Pulverized Bituminous and Subbituminous Coal	16.07	2.024	

Throughput Data

553	MMBtu/hr	Heat Input rating
0.013	MMBtu/lb	Minimum monthly average for delivered coal
21.27	tons/hr	Hourly coal throughput at high heat input rating

Table A3
No. 8 Power Boiler BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

condensable split

	total	filterable	condensable	H_2SO_4	condensable - H_2SO_4
%		N/A	N/A	72%	28%
(g/s)	**N/A**	2.58	1.39	1.01	0.39

		FILTERABLE						CONDENSABLE			
						fine filterable					
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	inorganic (100% of fine filterable) (g/s)	elemental carbon (0% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%	PM800	6.00 - 10.00	38.0%	0.98	**0.9787**						6.00 - 10.00
	PM425	2.50-6.00	11.0%	0.28	**0.2833**						2.50-6.00
	PM187	1.25-2.50	16.0%	0.41		**0.4121**	**0.0000**				1.25-2.50
fine (57.6%)	PM112	1.00-1.25	4.0%	0.10		**0.1030**	**0.0000**				1.00-1.25
	PM081	0.625-1.00	11.0%	0.28		**0.2833**	**0.0000**		**0.0000**	**0.1928**	0.625-1.00
	PM056	0.50-0.625	20.0%	0.52		**0.5151**	**0.0000**		**0.0000**	**0.1928**	0.50-0.625
total			100%	2.58	**1.26**	**1.31**	**0.00**	**1.01**	**0.00**		
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Table A4
No. 4 Recovery Furnace BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
NO_X	69.72	lb/hr	Based on 1997 emission test result of 51 lb NO_X/hr. The test results were scaled by ratioing the maximum average 24-hr rolling RF steam production (470,908 lb steam/hr)by the steam production rate from the test (344,460 lb steam/hr).	69.72	8.785	Representative BLS throughput data were not available from the 1997 emissions test. The ratio of steam production from the test compared to the historical maximum actual 24-hr average steam production was used to scale the emission rate.
SO_2	164.05	lb/hr	Based on 1997 emission test result of 120 lb SO_2/hr. The test results were scaled by ratioing the maximum average 24-hr rolling RF steam production (470,908 lb steam/hr)by the steam production rate from the test (344,460 lb steam/hr).	164.05	20.670	Representative BLS throughput data were not available from the 1997 emissions test. The ratio of steam production from the test compared to the historical maximum actual 24-hr average steam production was used to scale the emission rate.
H_2SO_4	0.008	lb/tons BLS	MedianValue from NCASI SARA 313 Handbook, Chemical-Specific Information for Sulfuric Acid.	0.48	**0.060**	This value is used in the No. 4 RF PM Distribution Calculation Spreadsheet. The emissions of H_2SO_4 are subtracted from the calculated condensable particulate emissions.
Filterable PM_{10} - PM_6	6.8%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP and NCASI Technical Bulletin 884 Table A11d.	1.86	0.234	Due to the nature of a recovery furnace, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable PM_6 - $PM_{2.5}$	14.4%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	3.94	0.497	Due to the nature of a recovery furnace, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{2.5}$ - $PM_{1.25}$	13.3%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	3.64	0.459	Due to the nature of a recovery furnace, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	6.3%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	1.72	0.217	Due to the nature of a recovery furnace, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	12.0%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	3.28	0.414	Due to the nature of a recovery furnace, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	22.2%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	6.08	0.765	Due to the nature of a recovery furnace, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Organic Condensable $PM_{1.0}$ - $PM_{0.625}$	18.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	2.23	0.281	
Inorganic Condensable $PM_{1.0}$ - $PM_{0.625}$	82.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	10.17	1.281	
Organic Condensable $PM_{0.625}$ - $PM_{0.5}$	18.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	2.23	0.281	
Inorganic Condensable $PM_{0.625}$ - $PM_{0.5}$	82.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI Technical Bulletin 852 Table 6.7.3 shows that on average 82% of condensable particulate emissions from a DCE recovery furnace are inorganic, while 18% of condensable particulate emissions are organic in nature. The value shown here reflects the subtraction of H_2SO_4 emissions.	10.17	1.281	
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM (Method 5)	0.4794	lb/tons BLS	3/2004 EPA Method 5 Emissions Testing.	27.37	**3.448**	This value is used in the No. 4 RF PM Distribution Calculation Spreadsheet.
Condensable PM	0.4429	lb/tons BLS	Median value from NCASI Technical Bulletin 884 Table A11d.	25.28	**3.186**	This value is used in the No. 4 RF PM Distribution Calculation Spreadsheet.
Condensable $PM_{1.0}$ - $PM_{0.625}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	12.40	1.563	The value shown here reflects the subtraction of H_2SO_4 emissions.
Condensable $PM_{0.625}$ - $PM_{0.5}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	12.40	1.563	The value shown here reflects the subtraction of H_2SO_4 emissions.
Total Filterable PM_{10}	76.8%	% of Method 5 PM	Median value from NCASI Technical Bulletin 884 Table A11d.	21.02	2.648	
Total Filterable $PM_{2.5}$	53.8%	% of Method 5 PM	AP-42 Table 10.2-2 For DCE Recovery Furnace Equipped with an ESP.	14.72	1.855	

Throughput Data

1370	tons BLS/day	Highest daily production value from 3/13/2004 to 4/12/2006
913	ADTP/day	Used Historic production ratio of 1.5 TBLs to 1 ADTP

Table A5
No. 4 Recovery Furnace BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

	total	filterable	condensable		condensable split H_2SO_4	condensable - H_2SO_4
%		N/A	N/A		2%	98%
(g/s)	**N/A**	3.45	3.19		0.06	3.13

		FILTERABLE						CONDENSABLE			
						fine filterable					
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	inorganic (100% of fine filterable) (g/s)	elemental carbon (0% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	6.8%	0.234	**0.2345**						6.00 - 10.00
	PM425	2.50-6.00	14.4%	0.497	**0.4965**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	13.3%	0.459		**0.4586**	**0.0000**				1.25-2.50
	PM112	1.00-1.25	6.3%	0.217		**0.2172**	**0.0000**				1.00-1.25
	PM081	0.625-1.00	12.0%	0.414		**0.4138**	**0.0000**		**0.2813**	**1.2813**	0.625-1.00
	PM056	0.50-0.625	22.2%	0.765		**0.7655**	**0.0000**		**0.2813**	**1.2813**	0.50-0.625
total			75%	2.59	**0.73**	**1.86**	**0.00**	**0.06**	**0.56**	**2.56**	
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Table A6

No. 4 Smelt Dissolving Tank BART Emissions Inventory

Smurfit-Stone Container Enterprises - West Point, VA Mill

MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
NO_X	0.033	lb/tons BLS	Mean value from NCASI Technical Bulletin 884 Table 4.15, this is the value currently used by the Mill. The median value is 0.020 lb/TBLS.	1.88	0.237	
SO_2	0	lb/hr	Previous emission tests of the No. 4 Smelt Dissolving Tank indicate that SO_2 were below the detection limit.	0.00	0.000	
H_2SO_4	N/A			--	--	
Ammonia	0.12	lb/tons BLS	Mean value from NCASI Technical Bulletin 858 Table A-15. Median value not available.	6.85	0.863	
Filterable PM_{10} - PM_6	1.1%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.06	0.007	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable PM_6 - $PM_{2.5}$	7.1%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.37	0.047	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{2.5}$ - $PM_{1.25}$	17.8%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.94	0.118	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	8.8%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.46	0.059	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	16.0%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	0.84	0.106	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	38.7%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	2.04	0.257	Due to the nature of the smelt dissolving tank, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Organic Condensable $PM_{1.0}$ - $PM_{0.625}$	19.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.10	0.012	
Inorganic Condensable $PM_{1.0}$ - $PM_{0.625}$	81.0%	% of Condensable $PM_{1.0}$ - $PM_{0.625}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.41	0.051	
Organic Condensable $PM_{0.625}$ - $PM_{0.5}$	19.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.10	0.012	
Inorganic Condensable $PM_{0.625}$ - $PM_{0.5}$	81.0%	% of Condensable $PM_{0.625}$ - $PM_{0.5}$	NCASI summary for Technical Bulletins No. 884 and 898 Table 1 shows that on average 81% of condensable particulate emissions from smelt dissolving tanks are inorganic, while 19% of condensable particulate emissions from smelt dissolving tanks are organic in nature.	0.41	0.051	
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM (Method 5)	0.0925	lb/tons BLS	3/2004 EPA Method 5 Emissions Testing	5.28	**0.665**	This value is used in the No. 4 SDT PM Distribution Calculation Spreadsheet.
Condensable PM	19.0%	% of Method 5 PM	NCASI Technical Bulletin 884 Table 4.15	1.00	**0.126**	This value is used in the No. 4 SDT PM Distribution Calculation Spreadsheet.
Condensable $PM_{1.0}$ - $PM_{0.625}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	0.50	0.063	
Condensable $PM_{0.625}$ - $PM_{0.5}$	50.0%	Percent of Condensable PM	Recommended Distribution from VISTAS calculation spreadsheet. No other guidance on condensable particulate size distribution available.	0.50	0.063	
Total Filterable PM_{10}	89.5%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	4.73	0.595	
Total Filterable $PM_{2.5}$	81.3%	% of Method 5 PM	AP-42 Table 10.2-7 For Smelt Dissolving Tank Equipped with Venturi Scrubber.	4.29	0.541	

Throughput Data

1370 tons BLS/day Highest daily production value from 3/13/2004 to 4/12/2006. Daily production was not monitored prior to 3/13/2004 (i.e., Subpart MM compliance date)

Table A7
No. 4 Smelt Dissolving Tank BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

	total PM	filterable	condensable	condensable split H_2SO_4	condensable split condensable - H_2SO_4
%		N/A	N/A	0%	100%
(g/s)	**N/A**	0.67	0.13	0.00	0.13

		FILTERABLE						CONDENSABLE			
						fine filterable					
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	inorganic (100% of fine filterable) (g/s)	elemental carbon (0% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	1.1%	0.007	**0.0073**						6.00 - 10.00
	PM425	2.50-6.00	7.1%	0.047	**0.0472**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	17.8%	0.118		**0.1184**	**0.0000**				1.25-2.50
	PM112	1.00-1.25	8.8%	0.059		**0.0585**	**0.0000**				1.00-1.25
	PM081	0.625-1.00	16.0%	0.106		**0.1064**	**0.0000**		**0.0120**	**0.0512**	0.625-1.00
	PM056	0.50-0.625	38.7%	0.257		**0.2575**	**0.0000**		**0.0120**	**0.0512**	0.50-0.625
total			90%	0.60	**0.05**	**0.54**	**0.00**	**0.00**	**0.02**	**0.10**	
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	

Table A8

No. 15 Lime Slaker BART Emissions Inventory

Smurfit-Stone Container Enterprises - West Point, VA Mill

MILL SUPPORTING INFORMATION

	Emission Factor	Emission Factor Units	Emission Factor Notes	BART Emission Rate		Emission Rate Notes
				lb/hr	g/s	
Modeled Emission Rates						
Ammonia	0.28	lb/ton CaO	MedianValue from NCASI SARA 313 Handbook, Chemical-Specific Information for Ammonia.	3.72	0.47	
Filterable PM_{10} - PM_{6}	0.0%	% of Method 5 PM		0.00	0.000	
Filterable PM_{6} - $PM_{2.5}$	0.0%	% of Method 5 PM		0.00	0.000	
Filterable $PM_{2.5}$ - $PM_{1.25}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.25}$ - $PM_{1.0}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{1.0}$ - $PM_{0.625}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Filterable $PM_{0.625}$ - $PM_{0.5}$	25.0%	% of Method 5 PM	Distributed slaker particulate emissions evenly among filterable $PM_{2.5}$ size range categories	0.07	0.009	Due to the nature of a lime slaker, it is assumed these emissions represent inorganic fine filterable material. No elemental carbon emissions are assumed.
Supporting Emission Rates (For calculation or reporting purposes only)						
Total PM	0.022	lb/ton CaO	Median Value NCASI Technical Bulletin 884 Table A14b	0.29	**0.037**	This value is used in the No. 15 Lime Slaker PM Distribution Calculation Spreadsheet.
Condensable PM	0.0%	% of Method 5 PM	Assumed that condensable particulate emissions were negligible since the slaker is a wet source, and no emissions data identifying condensable particulate emissions from lime slakers are available.	0.00	**0.000**	
Total Filterable PM_{10}	100.0%	% of Method 5 PM	NCASI Technical Bulletin 884 Table A14b	0.29	0.037	
Total Filterable $PM_{2.5}$	100.0%	% of Method 5 PM	Conservatively assumed that all PM10 is less than 2.5 microns in diameter	0.29	0.037	

Throughput Data

13.29 ton CaO/hr Maximum throughput rate based on 319 tons CaO/day capacity.

Table A9
No. 15 Lime Slaker BART Emissions Inventory
Smurfit-Stone Container Enterprises - West Point, VA Mill
VISTAS FORMAT - PM Speciation

condensable split

	total	filterable	condensable	H_2SO_4	condensable - H_2SO_4
%		N/A	N/A	0%	100%
(g/s)	**N/A**	0.04	0.00	0.00	0.00

		FILTERABLE						CONDENSABLE			
		Diameter (µm)	%	filterable (g/s)	coarse filterable inorganic (g/s)	fine filterable inorganic (96.3% of fine filterable) (g/s)	fine filterable elemental carbon (3.7% of fine filterable) (g/s)	H_2SO_4 (g/s)	organic condensable (g/s)	inorganic condensable (g/s)	Diameter (µm)
coarse (42.4%)	PM800	6.00 - 10.00	0.0%	0.00	**0.0000**						6.00 - 10.00
	PM425	2.50-6.00	0.0%	0.00	**0.0000**						2.50-6.00
fine (57.6%)	PM187	1.25-2.50	25.0%	0.01		**0.0092**	**0.0000**				1.25-2.50
	PM112	1.00-1.25	25.0%	0.01		**0.0092**	**0.0000**				1.00-1.25
	PM081	0.625-1.00	25.0%	0.01		**0.0092**	**0.0000**		**0.0000**	**0.0000**	0.625-1.00
	PM056	0.50-0.625	25.0%	0.01		**0.0092**	**0.0000**		**0.0000**	**0.0000**	0.50-0.625
total			100%	0.04	**0.00**	**0.04**	**0.00**	**0.00**	**0.00**		
					PMC	**SOIL**	**EC**	**H_2SO_4**	**SOA**	**SOIL**	
Ext. coefficient					0.6	1	10	3*f(RH)	4	1	